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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/530,069	07/03/2000	Serge Vanhaelemeersch	VANM149.001A	7478

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EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 12/31/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09-530,069

Applicant(s)

Vanhoelemeer et al

Examiner

George Goudreau

Group Art Unit

1763

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on (10-98' to 9-00') (i.e., papers # 1-6)

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-16 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-16 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some* ☒ None of the:

☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). C

☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other _____

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15. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-The usage of the term "predetermined" in claims 9, and 16 is vague, and indefinite.; and

-The language used in the last paragraph of claims 1, and 14 is confusing, and should be reworded. The last paragraph of these claims states that "...the sidewalls of said opening are fluorinated...", and that "...substantially no etch residues are deposited...". A fluorinated sidewall in the etched opening is a type of etch residue. Thus, the statement that substantially no etch residues are deposited conflicts with the statement that the sidewalls are fluorinated.

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. Claims 1, 4, 6-7, 9-10, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang et. al. (6,162,583).

Yang et. al. disclose a process for forming a via in a 3 layer IMD (16, 18, 20) which connects to an underlying gate (14). The 3 layer IMD is comprised of a SiO₂ hard mask layer (20), a Si₃N₄ layer (18), and a low K dielectric layer (18). The low K dielectric layer is comprised of an organic material such as polyimide, PTFE, or a Si based polymer. They employ a

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plasma comprised of any of CF₄, CO₂, CHF₃, and Ar to anisotropically etch the low K dielectric layer. This is discussed specifically in columns 5-6; and discussed in general in columns 1-10. This is shown in figures 6-11.

It would have been inherent that the fluorine based plasma used to etch the low K dielectric layer would have fluorinated the sidewalls of the low K dielectric layer in the process of etching it without producing an excessive amount of etch deposits. The examiner cites the case law listed below of interest to the applicant in this regard.

In re Swinehart (169 U.S.P.Q. 226 (CCPA)) and In re Best (195 U.S.P.Q. 430 (CCPA)) state that when an examiner has reasonable basis for believing that functional characteristics asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be inherent characteristics of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied upon.

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to

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the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

20. Claims 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et. al. as applied in paragraph 17 above.

Yang et. al. as applied in paragraph 17 above fail to disclose the following aspects of applicant's claimed invention:

- the specific usage of N2 as the inert gas carrier in the plasma etchant;
- the specific etching process parameters which are claimed by the applicant;
- the specific usage of the type of low dielectric constant materials which are claimed by the applicant to form the low dielectric constant layer in the device fabricated in the process taught above

It would have been obvious to one skilled in the art to replace the Ar carrier gas used in the plasma etchant taught above with a N2 carrier gas based upon the following. The usage of N2 as an inert gas diluent (i.e.-carrier gas) in a plasma etchant is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, this would have simply involved the usage of an alternative, and at least equivalent means for supplying an inert gas diluent in a plasma etchant to those means which are specifically taught above.

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It would have been obvious to one skilled in the art to employ any of a variety of different low K dielectric materials to form the low K dielectric layer in the process taught above including those materials which are specifically claimed by the applicant. (The examiner takes official notice in this regard.) Further, this would have simply involved the usage of an alternative, and at least equivalent means for supplying a low K dielectric layer in a device to those means which are specifically taught above.

It would have been prima facie obvious to employ any of a variety of different etch process parameters in the etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undue experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific etching process parameters which are claimed by the applicant to conduct the etching process taught above based upon In re Aller as cited below.

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).


21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.


George A. Goudreau/gag

Examiner AU 1763